

Assessment Plan bachelor's degree programme Computing Science 2023-2024

Introduction

This Assessment Plan is a systematic description of the way of examination and assessment of all study components in the bachelor's degree programme Computing Science 2023-2024 that is offered by the department of Computing Science. It is based on the assessment policy of the Faculty of Science and Engineering (FSE), as set out in the 2016-2017 version of the FSE Quality Assurance Manual (Chapter 6: Assessment policy) and the protocol setting out the duties and powers of the Faculty's Board of Examiners (Manual for Board of Examiners 2017-2018, Chapter 4: Duties of the Board of Examiners).

The Assessment Plan consists of the following parts:

1. Objective of the degree programme.
2. Learning outcomes of the degree programme.
3. An overview of the examiners and the mode of assessment for each study component in the degree programme offered by the department Computing Science.
4. A matrix showing the relationship between the study components and the learning outcomes.
5. A description of the curriculum of the degree programme.
6. Descriptions of the content of each study component, consisting of:
 - objectives
 - description of content
 - lecturers
 - assessment mode(s) and calculation of final mark
 - mode(s) of instruction.

Parts 5 and 6 are not incorporated in this document. For part 5 we refer to the sections III, IV and V of the *Appendix of the Teaching and Examination Regulations BSc Computing Science 2023-2024*. Part 6 is available in the online course catalogue Ocasys¹, which provides detailed information for all items mentioned under point 6 above for each of the courses in the Computing Science bachelor programme.

¹ <http://www.rug.nl/ocasys/>

1. Objective of the degree programme

The objective of the bachelor programme Computing Science is to teach the students a combination of *knowledge* (including facts, understanding, and insights), *skills* (including competences) and *attitudes* (including best practices and interaction skills) in Computing Science that both enables them to function professionally on an academic level in Computing Science, and qualifies them for an academic master programme in Computing Science or a related academic discipline.

2. Learning outcomes of the degree programme

Graduates of the Bachelor degree programme Computing Science:

1. Have the following knowledge, understanding and insights on an academic level:

- a. knowledge of the main topics of the Computing Science discipline;
- b. understanding of common themes and principles of Computing Science on different levels of abstraction;
- c. insight in the applicability of Computing Science and the interplay between its theory and practice components;
- d. either d1: in-depth knowledge of certain topics in the field of Computing Science,
or d2: broad-based knowledge of topics in a different discipline at the bachelor level.

2. Have the following skills and competences, on an academic level:

- a. technical skills associated with Computing Science, including relevant mathematical, analytic, and logical skills;
- b. relevant soft skills, including communication, presentation (oral and in writing), intercultural teamworking, and self-managed learning;
- c. academic skills, including conceptual thinking, critical questioning and argumentation, judgement forming, scientific research, and writing and presenting in English;
- d. the competence to analyze, structure, and (re)define and solve problems, using computational methods and tools;
- e. the competence to design, develop and evaluate (test) computer systems;
- f. the competence to apply their knowledge and understanding of Computing Science in a globalized professional and entrepreneurial context.

3. Have the following attitudes:

- a. appreciation of the role and importance of mathematics, related disciplines, and domain-specific knowledge;
- b. commitment to professional responsibility, including ethical, societal and intercultural issues, with a (self-) critical attitude;
- c. critical and academic attitude towards information and knowledge;
- d. preparedness to life-long learning, based on the awareness of the highly dynamical character of Computing Science.

3. Overview of the examiners and a the mode of assessment for each study component offered by the department Computing Science

For the assessment methods, the following abbreviations are used:

WE: written exam

OR: oral exam

TG: participation in tutor group, including presentation

ME: written midterm exam

HW: homework

LA: computer lab assignment

LAR: computer lab assignment, including reporting

OA: other assignments, including reporting

P: presentation

TH: thesis

Year 1 (propaedeutic phase):

Course name	1 st and 2 nd examiner	Assessment
Programming Fundamentals	A. Meijster, J.A. Perez	WE, LA
Introduction to Logic (CS)	H.H. Hansen, D. Frumin	HW, ME, WE
Introduction to Computing Science	M.H.F. Wilkinson, S.D. Frey	TG, HW, LAR, WE
Discrete Structures	D. Düstegör, I. Bliznets	WE
Computer Architecture	R. Zare Hassanpour, tbd	LAR, WE
Algorithms and Data Structures in C (for CS)	S.D. Frey, D. Feitosa	LAR, WE
Calculus for CS**	P. Tibboel (Math), J. Kosinka	OA, WE, ME
Introduction to Information Systems	D. Karastoyanova, F.F.M. Mohsen	HW, LAR, WE
Object-Oriented Programming (for CS)	A. Rastogi, D. Feitosa	LAR, WE
Linear Algebra	tbd (Math), J. Kosinka	tbd
Computer Networks	tbd, K. Haghshenas	tbd

Year 2:

Course name	1 st and 2 nd examiner	Assessment
Advanced Object Oriented Programming	D. Feitosa, A. Lazovik	LAR, WE
Functional Programming	A. Meijster, D. Frumin	LAR, WE
Statistics and Probability	E.A. Tatar, J. Guo	WE
Problem Analysis and Software Design	D. Feitosa, R. Smedinga	OA, P
Web Engineering	V. Andrikopoulos, A. Lazovik	LAR, WE
Signals and Systems (for CS)	A. Meijster, De Weerd (AI)	LAR, WE
Introduction to Scientific Computing	J. Guo, M. Biehl	LA, WE
Computing Science: Ethical and Professional Issues	G.A.H. Laugs, M.H.F. Wilkinson	OA, WE, P
Software Engineering (part 1 & 2)	A. Capiluppi, P. Avgeriou	OA, LAR
Languages and Machines	J.A. Perez, D. Frumin	HW, WE
Parallel Computing	tbd, R. Zare Hassanpour	WE

Year 3:

Course name	1 st and 2 nd examiner	Assessment
Information Security*	F. Turkmen, F.F.M. Mohsen	LAR, WE
Introduction to Machine Learning*	M. Biehl***, J. Guo	LAR, WE
Information Retrieval*	G. Azzopardi, M. Riveni	WE, P, OA
Computational Complexity*	D.R.S. Ramanayake, J.A. Perez	OA
Programming in C++*	J. Bokma, D. Feitosa	P, OA
Software Language Engineering*	T. van der Storm, P. Avgeriou	WE
Compiler Construction*	A. Meijster, J.A. Perez	OA, WE
Short Programming Project*	K. Bunte	OA
Operating Systems	F.F.M. Mohsen, R. Zare Hassanpour	LAR, WE
Computer Graphics	J. Kosinka, S.D. Frey	LAR, WE
Research Skills in Computing Science	J. Kosinka, R. Smedinga	OA
Advanced programming in C++*	J. Bokma, D. Feitosa	P, OA
Bachelor's project	[supervising teachers] P. Avgeriou, G. Azzopardi	TH, P

* Elective course

** Courses provided by Artificial Intelligence or Mathematics. Their examiners are not listed as BSc Computing Science examiners.

*** Prof. dr. Biehl will temporarily be replaced by dr. J. Guo due to limited availability. Dr. M. Babai will serve as the second examiner.

List of examiners for the Bachelor Computing Science 2023-2024:

Name	Examiner Bachelor project	Course examiner
prof. dr. V. Andrikopoulos	X	X
prof. dr. P. Avgeriou	X	X
dr. G. Azzopardi	X	X
prof. dr. M. Biehl	X	X
J. Bokma		X
prof dr. K. Bunte	X	X
prof. dr. A. Capiluppi	X	X
dr. D. Düstegör	X	X
dr. D. Feitosa	X	X
dr. S.D. Frey	X	X
prof. dr. G. Gaydadjiev	X	X
dr. J. Guo	X	X
prof. dr. H.H. Hansen	X	X
prof. dr. D. Karastoyanova	X	X
prof. dr. J. Kosinka	X	X
G.A.H. Laugs	X	X
prof. dr. A. Lazovik	X	X
dr. A. Meijster	X	X
dr. F.F.M. Mohsen	X	X
prof. dr. J.A. Perez Parra	X	X
dr. D.R.S. Ramanayake	X	X
dr. A. Rastogi	X	X
dr. M. Riveni	X	X
dr. M.A.M. Soliman	X	X
prof. dr. M. Stal	X	
dr. O.T. Tursun	X	X
prof. dr. T. van der Storm	X	X
dr. F. Turkmen	X	X
dr. M.H.F. Wilkinson	X	X
dr. A.E. Tatar		X
dr. M. Babai	X	X
dr. B. Setz	X	
dr. K. Haghshenas	X	X
dr. H. Groefsema	X	X
dr. I. Bliznets	X	X
dr. R. Zare Hassanpour	X	X
dr. C. Kehl	X	X
dr. D. Frumin	X	X
prof. dr. N. Petkov	X	
prof. dr. G.R. Renardel de Lavalette	X	
prof. dr. J.B.T.M. Roerdink	X	
dr. R. Smedinga	X	X

For thesis projects, projects part of Research Skills in Computing Science, and the Short Programming Project, PhD students and Postdocs can serve as second examiner.

4. Relation between the study components and the learning outcomes

For completeness, in the table below all courses which are part of the Computer Science bachelor programme are listed. Apart from the courses offered by the department Computer Science (detailed in Section 3), these include also courses offered by other departments (Mathematics and Artificial Intelligence). We include these in the overview below since, this way, a complete picture of the coverage of the learning outcomes is obtained.

The learning outcomes (1a...3d) referred to in the table below have been already detailed in Section 2. The indicators '1' and '2' in the table cells refer respectively to:

- 1 means a *weak* relation between the corresponding learning outcome and study component is present; the respective course addresses only parts (subcomponents) of the respective learning outcome;
- 2 means: a *strong* relation between the corresponding learning outcome and study component is present; the respective course addresses the respective learning outcome to a great extent.

Block	Course name	1a	1b	1c	1d1	1d2	2a	2b	2c	2d	2e	2f	3a	3b	3c	3d
	Year 1															
1.1+1.2	Programming Fundamentals			2			2	2	1	2		1	1			
1.1	Introduction to Logic (CS)	2	1				2			2			1			
1.1	Introduction to Computing Science	2	1	1			1	2	1	1			1	2	1	
1.2	Discrete Structures	2		1			2			1					2	
1.2	Computer Architecture	1	2	2	1											
1.3	Algorithms and Data Structures in C (for CS)	2	1	1			2	1		2	1				1	
1.3	Calculus for Computing Science	1					2			1			2			
1.3	Introduction to Information Systems	2	2	1			1	1			1	1	2			
1.4	Object-Oriented Programming for CS		2	2				1		2	1		1			
1.4	Linear Algebra	1					2			1			2			
1.4	Computer Networks	1	1	1	2		1			1	2	2		1	1	1

Block	Course name	1a	1b	1c	1d1	1d2	2a	2b	2c	2d	2e	2f	3a	3b	3c	3d
	Year 2															
2.1	Advanced Object Oriented Programming			2	2			1		2	1					1
2.1	Functional Programming		1	2			2		1	2			1			
2.1	Statistics and Probability	1					2			2			1			
2.2	Problem Analysis and Software Design	1		1	2		1	2		2	2		1			1
2.2	Web Engineering	1	2		2			1		2						1
2.2	Signals and Systems for CS		1	2			2		1			2				
2.3	Introduction to Scientific Computing	1		1		2	1	1	1	2			2		1	
2.3	CS: Ethical and Professional Issues			1				2	1					2		1
2.3+2.4	Software Engineering	1						2			2	2		2		
2.4	Languages and Machines	2	1				2		1	2						
2.4	Parallel Computing	2			2		2			1						1

Block	Course name	1a	1b	1c	1d1	1d2		2a	2b	2c	2d	2e	2f		3a	3b	3c	3d
	Year 3																	
3.1	Information Security	1	1	1	2			1			1					1	2	1
3.1	Introduction to Machine Learning	2		2	2			2			1				1			1
3.1	Information Retrieval	2	2	1				2	1	1	1	1			1		1	
3.1	Computational Complexity	2	2	1	2			2		2	2				2			
3.2	Programming in C++	1	1	1		1		1	2	1	1	2			1	2		
3.2	Software Language Engineering	1	1	1	2			2		1	2		1					
3.2	Compiler Construction	2	2	2	2			2			2	2			2			
3.2	Short Programming Project			1				2	1	1	1	2			1			
3.3	Operating Systems	2	2	1	1			1		1	1		2					1
3.3	Computer Graphics			2	2			2										1
3.3	Research Skills in Computing Science				1	1			2	2	2		2			2	1	1
3.3	Advanced programming in C++	1	1	1		1		1	2	1	1	1				1	1	
3.4	Bachelor project (15 ECTS)	1			2			2	1	2	2					1	2	
Na	C++ fundamentals**	1		1				1	1		1							

** C++ fundamentals is not part of the CS programme, it is an elective for other degree programmes.